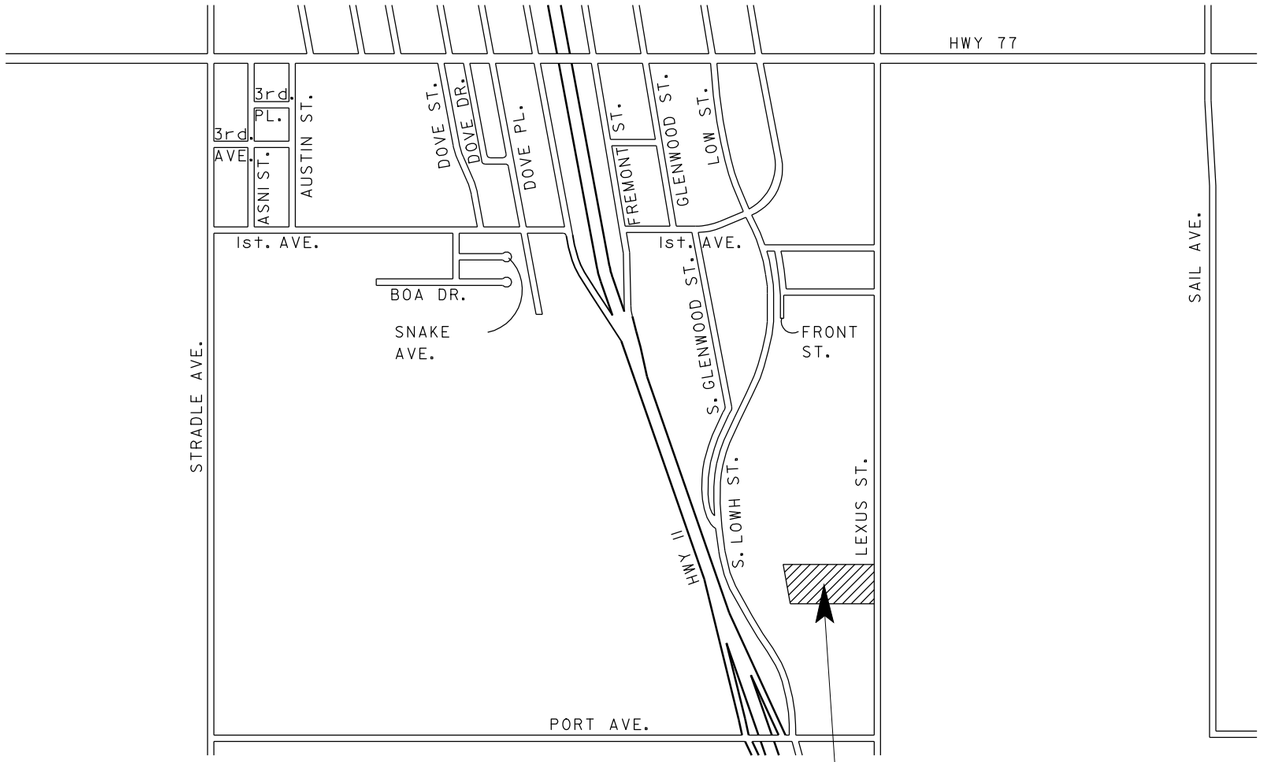
DIST	COUNTY	ROUTE	POST MILE TOTAL PROJECT	SHEET No	TOTAL SHEETS
06	KER	5707			

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR BUILDING CONSTRUCTION

IN XXXX COUNTY
IN YYYY CITY
AT THE ZZZZ MAINTENANCE STATION
ADDRESS OF FACILITY



LOCATION OF CONSTRUCTION
XX MAINTENANCE STATION

LOCATION MAP

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NO SCALE

The Contractor shall possess the Class (or classes) of license as specified in the ''Notice to Contractors''.

Project Engineer
Registered Electrical Engineer

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. 9-30-09 ELEC — STATE OF CALIFORNIA

Plans Approval Date

PROJECT COORDINATOR	X	DATE	X

Contract No. XX-XXXXXX

LAST REVISION 4/4/07 | USERNAME => otorres | DATE PLOTTED => 02-SEP-2009 | TIME PLOTTED => 16:52

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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REGISTERED ENGINEER-ELECTRICAL DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp. 9-30-09
ELEC
STATE OF CALIFORNIA

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ABBREVIATIONS

Ø	PHASE
A	AMPERE
AC	ALTERNATING CURRENT
Ah	AMPERES - HOUR
AL	ALUMINUM
BC	BATTERY CHARGER
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
DC	DIRECT CURRENT
DP	DUPLEX RECEPTACLE
(E)	EXISTING
EO	ELECTRICALLY OPERATED
G	GROUND
GEN	JUNCTION BOX
JB	KILOWATT
MC	METALLIC CONDUIT
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
MT	EMPTY CONDUIT
(N)	NEW
P	POLE
PB	PULL BOX
PTC	PV USA TEST CONDITIONS
PV	PHOTOVOLTAIC
STC	STANDARD TEST CONDITIONS
TYP	TYPICAL
V	VOLTS

LEGEND

- CONDUIT EXPOSED
- MC — CONDUIT, METALLIC UNDERGROUND
- PVC — CONDUIT, POLYVINYL CHLORIDE, UNDERGROUND
- CONDUIT, FLEXIBLE
- CONDUIT, TURN UP
- CONDUIT, TURN DOWN
- CIRCUIT BREAKER
- GROUNDING ELECTRODE
- ENCLOSURE BOND
- ADAPTER, ONE TYPE CONDUIT TO ANOTHER
- (J) EXISTING JUNCTION BOX
- EXISTING UNDERGROUND CONDUIT AND CONDUCTORS - REMOVE
- --E----E-- EXISTING CONDUIT AND CONDUCTORS-TO REMAIN UNLESS OTHERWISE NOTED
- A / EE-2 — SECTION/ELEVATION LETTER, SHEET NUMBER
- 1 / EE-2 — DETAIL NUMBER, SHEET NUMBER

General Notes:

A. *The Contractor shall verify true north prior to installation of PV system.*

B. *All AC/DC feeder conductors and equipment grounding conductors shall be sized to meet or exceed the following:*

- *Total net voltage drop of the PV electrical power generation system from PV source to the existing Panel M shall not exceed 2%.*
- *Upon occurrence of any kind of fault at any point in the system, over current protective devices shall trip within 1/2 cycle.*

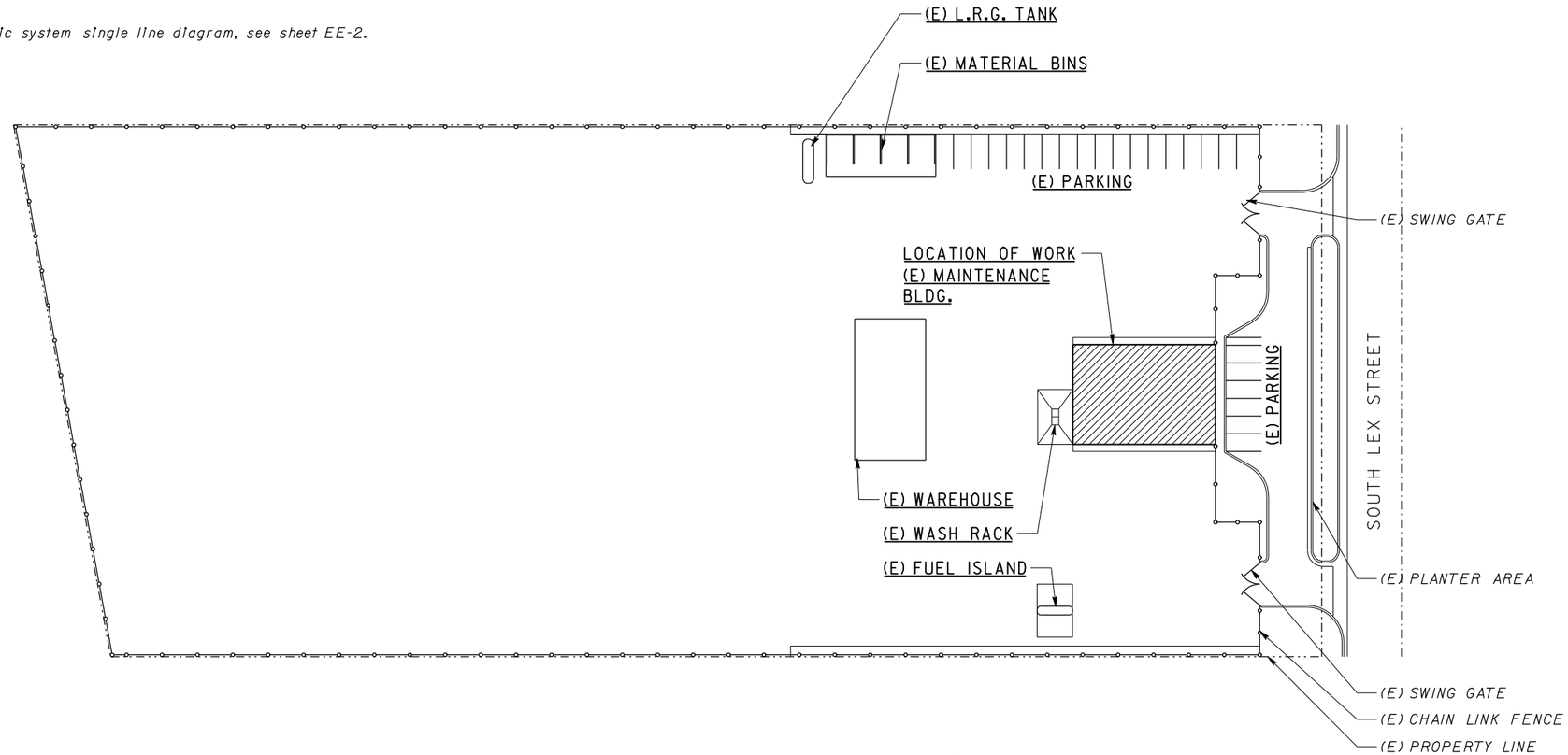
C. *Not all electrical/mechanical equipment and conduit systems are shown.*

D. *Location of all existing equipment and conduit systems as shown are approximate only. Contractor shall verify the exact location of all equipment and conduit systems in the field where required.*

E. *Sawcut existing paved surfaces at places where required for installation of underground conduit system and repair disturbed surfaces to match existing.*

F. *For photovoltaic system single line diagram, see sheet EE-2.*

INDEX OF SHEETS



SITE PLAN

SCALE 1" = 40'-0"

THIS DRAWING ACCURATE FOR ELECTRICAL WORK ONLY.

DESIGN SUPERVISOR	DESIGN	BY X	CHECKED X
DESIGN ENGINEER	DETAILS	BY	CHECKED X
	QUANTITIES	BY X	CHECKED X

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

BRIDGE NO.
KM POST

XX MAINTENANCE STATION PHOTOVOLTAIC SYSTEM

GENERAL PLAN AND LEGEND

SHEET **GP**

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FILE NO.:

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EA XXXXXX

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
8/17/09	8/28/09										

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DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED ELECTRICAL ENGINEER ____ DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ — Exp. 9-30-09 — ELEC — STATE OF CALIFORNIA

PLANS APPROVAL DATE

Photovoltaic Module

PV modules shall be polycrystalline silicon cell type module, with interconnection connectors rated for 90°C. PV modules shall be UL 1703 listed, with a maximum system voltage of 600 VDC. PV module manufacturer shall be one of those manufacturers listed as an eligible California Solar Initiative (CSI) PV module manufacturer.

Photovoltaic Array Circuit Combiner Box

PV array circuit combiner box shall be factory assembled, 600 VDC rated combiner box, with fused input circuits, two isolated DC bus bars, ground bus bar, all enclosed inside NEMA 3R lockable hinged cover enclosure. The combiner box shall be UL 1741 listed.

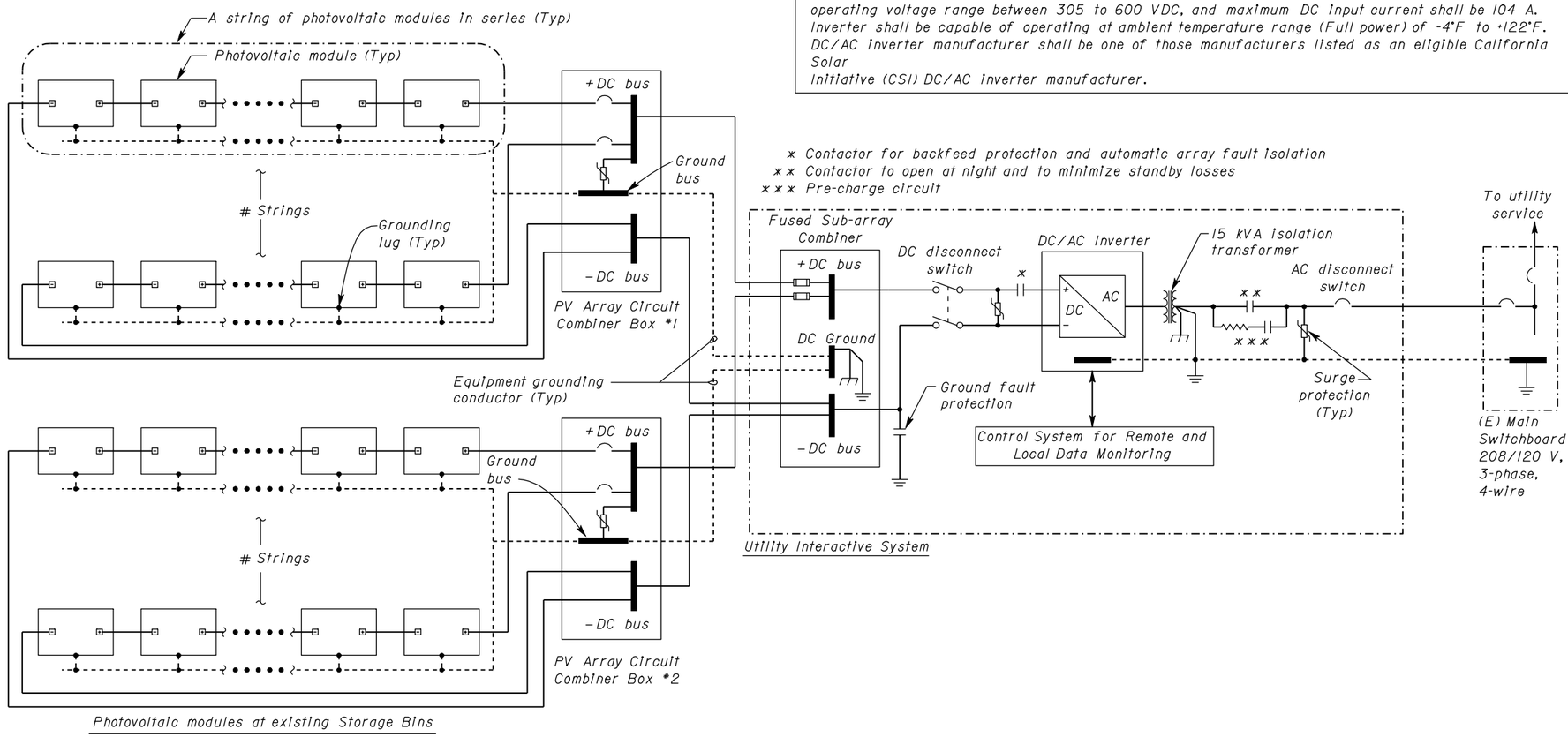
PV array circuit combiner box shall have the following components:
- DIN rail mounted touch safe fuse holders with fuse.
- Positive DC bus bar, negative DC bus bar and ground bus bar.
- DIN rail mounted Grid-Tie surge arrestor: The surge arrestor shall be rated to withstand 15 kA (8/20 micro second) induced transient surge type, and compatible to use with grounded PV arrays.

Utility Interactive System

Utility interactive system shall be outdoor type, factory assembled system consisting of the following equipment:
- NEMA 3R enclosure.
- 15 kW/15 kVA, 480/277 V, 3-phase, 4-wire, at a power factor of 0.99 or greater.
- Fused sub-array combiner, with minimum of 4 array inputs for positive DC, negative DC, and DC ground bus bars. Positive array inputs fuse size to match loading.
- Built-in DC and AC disconnect switches, size to match loading.
- Integrated 15 kVA, 480/277 V, 3-phase, 4-wire, output isolation type transformer.
- Ground fault protection.
- Integrated AC and DC surge protections.
- Integrated AC and DC contactors.
- Pre-charge circuit.
- Human machine interface (HMI). AC/DC Inverter's HMI shall be equipped with LCD and keypad displaying main menu. HMI main menu shall display system monitoring, status and faults, and operation. Monitoring menu shall display system status, metering, daily, weekly and monthly energy production. Status and faults menu shall display status messages, system output, and number of faults. Operation menu shall display control and settings.
- Local and remote monitoring systems capabilities.
- AC ground bus bars.

Enclosure shall be NEMA 3R, 14-gauge, and powder-coated standard factory finish steel enclosure. All screws, latches, hinge pins and similar hardware shall be stainless steel. HMI, AC and DC disconnect switches and equipment rating labels shall be mounted on the exterior door. Exterior door shall have interlock switch and be lockable with a padlock. The cabinet shall have MEV13 rated filtered, top entry forced air cooling system with one fan, sloped roof, and shall be suitable for seismic zone 4 compliance.

DC/AC inverter shall be rated at maximum continuous output power of 15 kW (15 kVA), with input operating voltage range between 305 to 600 VDC, and maximum DC input current shall be 104 A. Inverter shall be capable of operating at ambient temperature range (Full power) of -4°F to +122°F. DC/AC inverter manufacturer shall be one of those manufacturers listed as an eligible California Solar Initiative (CSI) DC/AC inverter manufacturer.



General Notes:

A. Provide and install all necessary warning labels/markings, per Article 690 of California Electrical Code (CEC), and the State Fire Marshal's guideline for solar PV installation.

B. Solar PV installation shall comply with the latest guideline from California Department of Forestry & Fire Protection, Office of the State Fire Marshal and latest Program Handbook from California Solar Initiative (CSI).

Photovoltaic System Requirements

Photovoltaic system complete design and installation details, inclusive of all Engineering calculations signed by an Professional Engineer of the respective field (both Electrical and Civil Engineering) in the State of California, shall be submitted for approval by the Contractor. The PV design shall meet or exceed the following requirements:

1) Total designed capacity of photovoltaic system at existing Storage Bins building shall be 15 kW CEC-AC rating. Number of PV modules per string shall be arranged in a manner to meet or exceed the following:
   - Maximum system voltage based on lowest excepted ambient temperature at the site (Voc maximum on coldest day) shall be no less than 1% of the Inverter's maximum input DC voltage range.
   - Maximum system power voltage, based on highest continuous ambient temperature at the site (Vmp on warmest day), shall be 20% greater than the Inverter's minimum input DC voltage range.

2) Photovoltaic system module row spacing shall be designed to prevent shading from adjacent module.

3) All wiring, except at module interconnection, shall be concealed inside conduit system.

4) Photovoltaic system modules structural support system shall be designed to withstand wind forces of 85-mile per hour.

5) Photovoltaic system wiring and protective devices shall meet or exceed the requirements of all applicable codes.

6) PV Array Circuit Combiner Boxes locations as shown are arbitrary only. Contractor shall install the combiner boxes at locations that best suit the photovoltaic system strings layout.

PRELIMINARY PLANS

DESIGN	BY	CHECKED	
DETAILS	BY	CHECKED	
QUANTITIES	BY	CHECKED	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

CU ?
EA ?

BRIDGE NO. 50M5707
POST MILE ?

XX MAINTENANCE STATION PHOTOVOLTAIC SYSTEM

SINGLE LINE DIAGRAM

SHEET **EE-2**

DOES SD Imperial Rev. 1/07

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

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REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
8/17/09	8/28/09										

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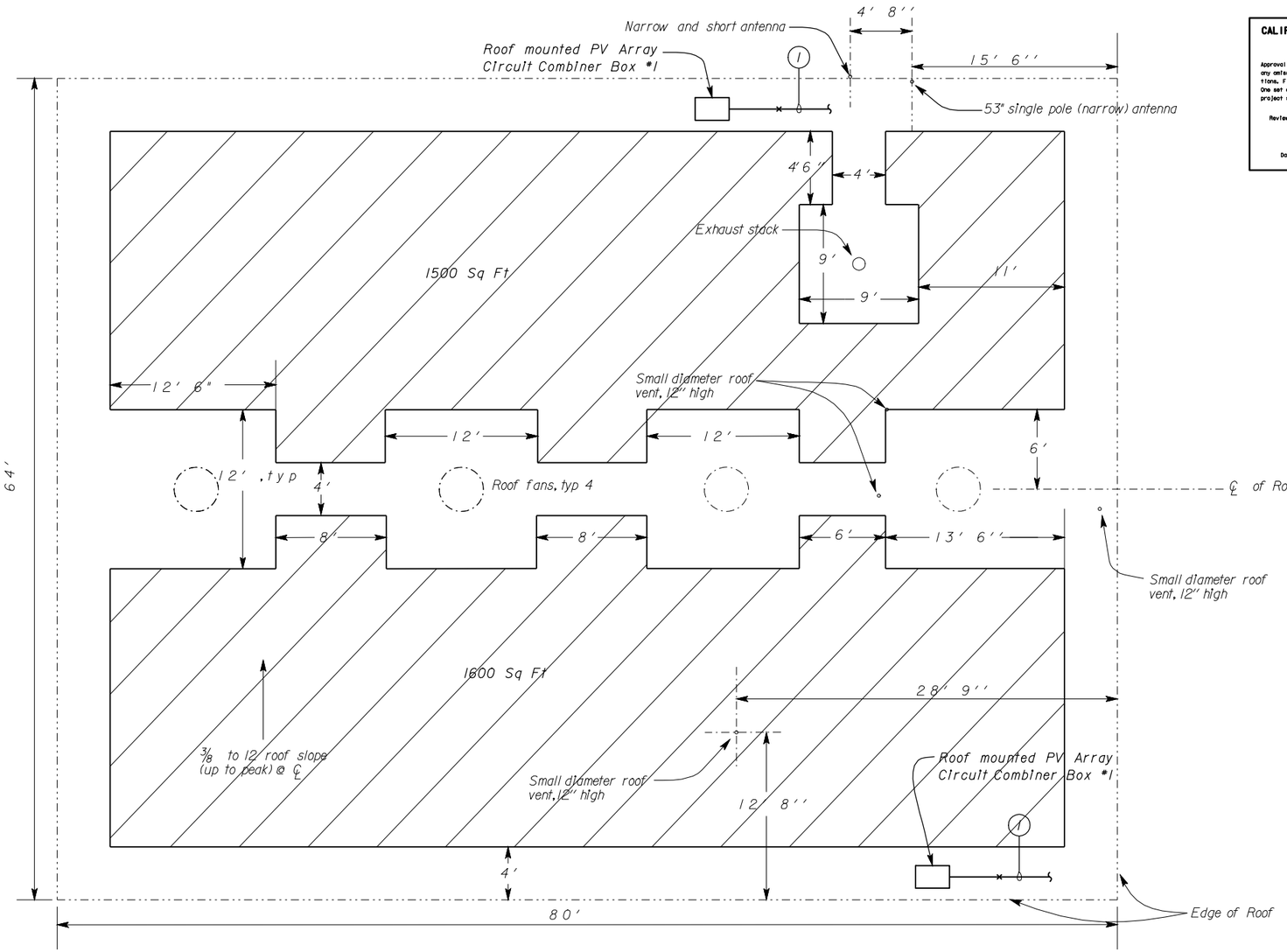

ROOF PLAN

No Scale

CALIFORNIA STATE FIRE MARSHAL
APPROVED

Approval of this plan does not authorize or approve any omission or deviation from applicable regulations. Final approval is subject to field inspection. One set of approved plans shall be available on the project site at all times.

Reviewed by: _____

Date: XX/XX/XX

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED ELECTRICAL ENGINEER _____ DATE _____

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. 9-30-09
ELEC
STATE OF CALIFORNIA

PLANS APPROVAL DATE _____

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Note:

(1) 2"C, MC with DC conductors and equipment grounding conductor to Utility-Interactive System Cabinet. For continuation, see sheet EE-4.

General notes:

A. Provide and install approved conduit support on top of the roof to support conduit system and junction boxes. Conduit support shall be one-piece and non metallic type. For conduit support details, see detail 1 on sheet EE1-4.

B. All exposed conduits shall be galvanized rigid steel, with minimum size ¾".

C. Size conduits to allow for 50% future capacity.

D. No DC wiring except at the module connector shall be exposed.

E. Use type CGB connectors at conduit terminations to exposed conductors.

F. DC conduit/conductors between PV modules and PV Array Circuit Combiner Boxes are not shown.

G. Existing Maintenance Building height from ground to the highest edge of the roof is approximately 16'.

H. For graphic symbols and abbreviations, see GP1.

I. For PV rack attachment detail, see detail 2 on EE1-4.

J. Provide and install all necessary warning labels/markings per Article 690 of California Electrical Code (CEC) and the State Fire Marshal's guideline for solar PV installation.

K. Solar PV Installation shall comply with the latest guideline from California Department of Forestry & Fire Protection, Office of the State Fire Marshal and latest Program Handbook from California Solar Initiative (CSI).

PRELIMINARY PLANS

	BY	CHECKED
DESIGN		
DETAILS	X	
QUANTITIES		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

CU ?
EA ?

BRIDGE NO. 50M5707
POST MILE ?

XX MAINTENANCE STATION PHOTOVOLTAIC SYSTEM

ROOF PLAN

SHEET **EE-3**

DOES SD Imperial Rev. 1/07

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

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REVISION DATES (PRELIMINARY STAGE ONLY): 7/15/09 7/16/09

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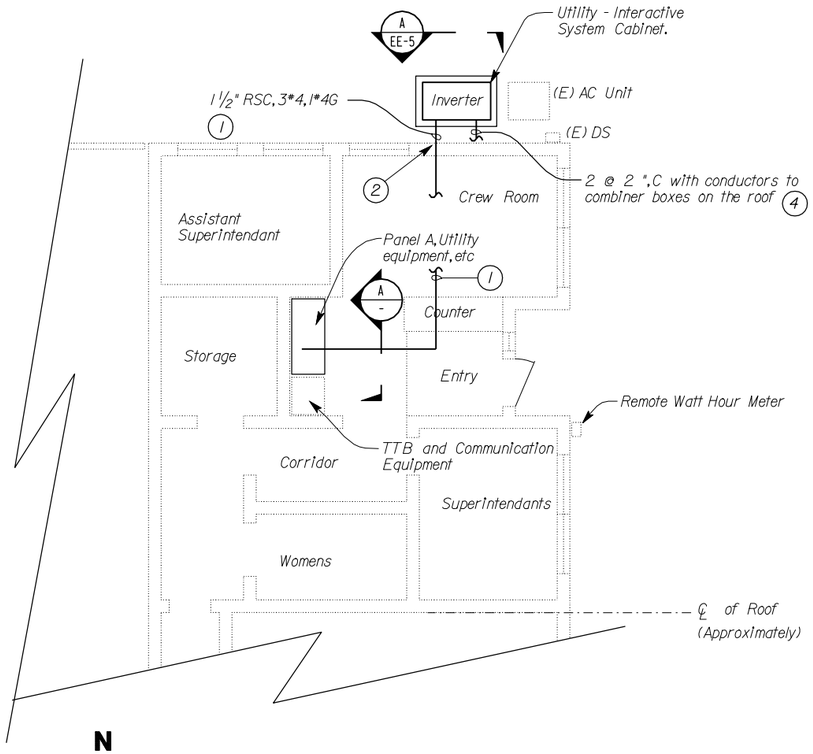
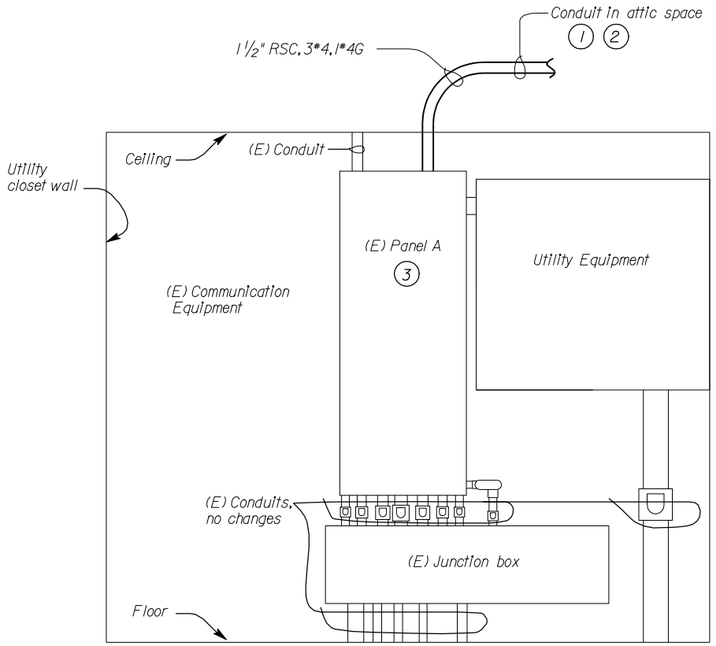


PARTIAL FLOOR PLAN

No Scale



A PANEL A ELEVATION

No Scale

Notes:

1. *Conduit shall be concealed in the attic, through the wall and down to the Inverter.*
2. *Seal around the conduit hole with silicon sealant where it exits the building.*
3. *Existing Panel is a 120/208 Volt, 3 phase, 4 wire, ITE manufacturer, type CDP panelboard. Install 3 pole, 60 ampere bolt connection type circuit breaker in Panel spaces 17,19,21. Connect #4 conductors from the Invertor to the circuit breaker and ground bus as required for operation.*
4. *For continuation see Sheet EE-3.*

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED ELECTRICAL ENGINEER ____ DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. 9-30-09 ELEC — STATE OF CALIFORNIA

PLANS APPROVAL DATE

PRELIMINARY PLANS

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DESIGN		
DETAILS	X	
QUANTITIES		

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DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

BRIDGE NO. 50M5707
POST MILE ?

XX MAINTENANCE STATION PHOTOVOLTAIC SYSTEM

PARTIAL FLOOR PLAN AND ELEVATION

SHEET **EE-4**

DOES SD Imperial Rev. 1/07

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

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EA ?

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REVISION DATES (PRELIMINARY STAGE ONLY): 7/18/09 8/18/09

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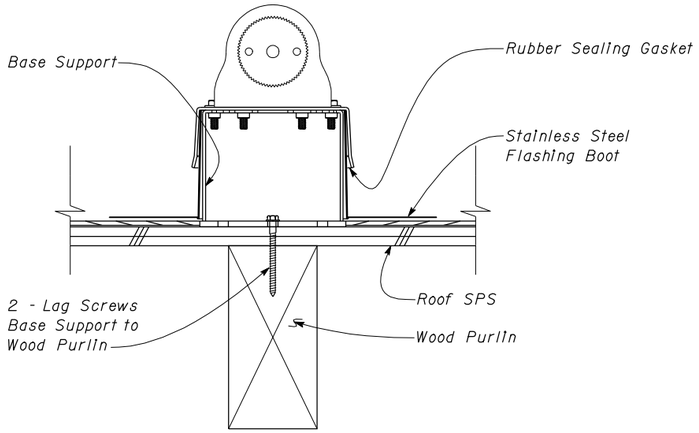
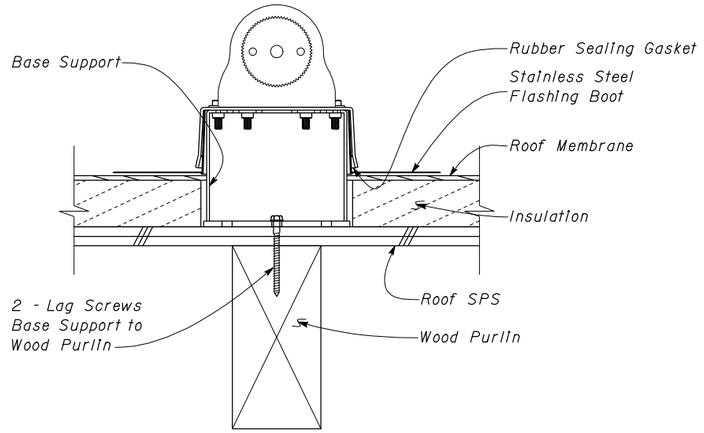


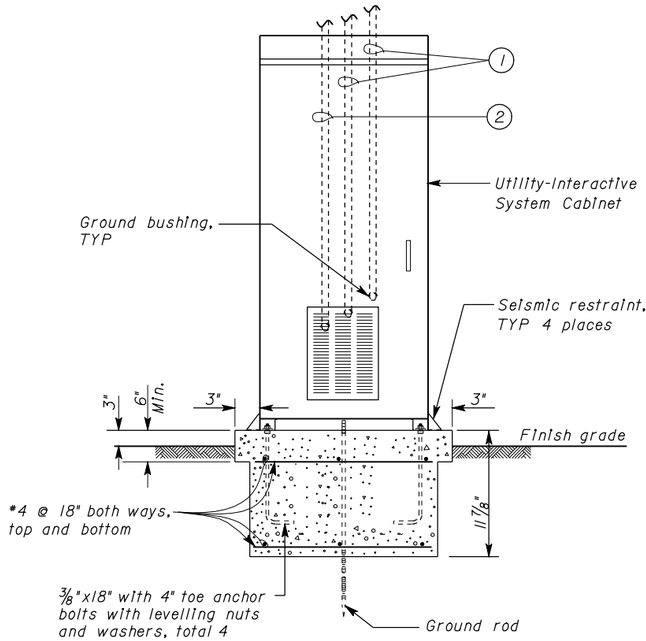
2 WOOD -NO INSULATION

No Scale

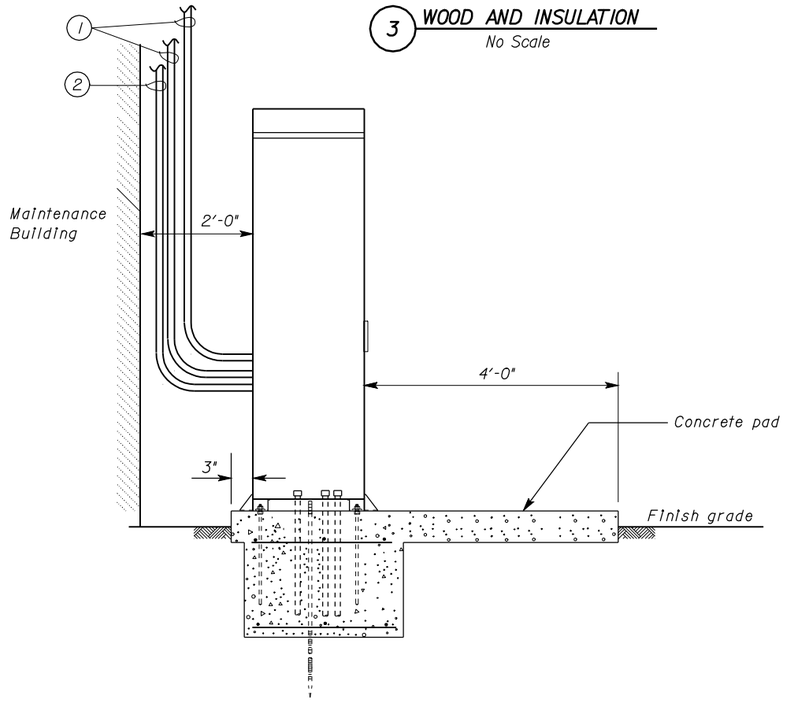


3 WOOD AND INSULATION

No Scale



FRONT VIEW



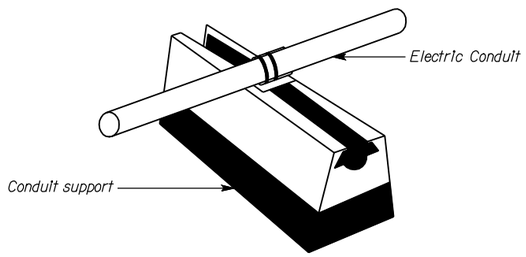
SIDE VIEW

A ELEVATION

NO SCALE

Note:

1. 2"C, MC with DC conductors and equipment grounding conductor to PV Array combiner boxes on the roof. For continuation, see sheet EE-3.
2. 1½" C, 3#4, 1#4G to (E) Panel A (via ceiling space). For continuation, see sheet EE-4.



ROOF EXPOSED CONDUIT SUPPORT

1

NO SCALE

CALIFORNIA STATE FIRE MARSHAL
APPROVED

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Reviewed by: _____

Date: XX/XX/XX

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED ELECTRICAL ENGINEER _____ DATE _____

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No. _____
Exp. 9-30-09
ELEC
STATE OF CALIFORNIA

PLANS APPROVAL DATE _____

PRELIMINARY PLANS

	BY	CHECKED
DESIGN		
DETAILS	X	
QUANTITIES		

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN

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EA ?

BRIDGE NO. 50M5707
POST MILE ?

XX MAINTENANCE STATION PHOTOVOLTAIC SYSTEM

ELEVATION AND DETAILS

SHEET **EE-5**

DOES SD Imperial Rev. 1/07

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

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REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
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